

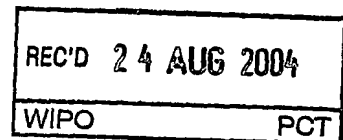


PCT/AU2004/001035

Patent Office
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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004900141 for a patent by CTECH EQUIPMENT PTY. LTD. as filed on 14 January 2004.

I further certify that the above application is now proceeding in the name of CTECH CLOSURES PTY LTD pursuant to the provisions of Section 113 of the Patents Act 1990.



WITNESS my hand this
Twelfth day of August 2004

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
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**IMPROVEMENTS RELATING TO A TAMPER EVIDENT RING
FOR A CONTAINER CLOSURE AND A CONTAINER NECK WITH
CORRESPONDING ANNULAR TAMPER BEAD**

This invention relates to a tamper evident ring for a container closure and a container neck. In particular it relates to a ring which is intended to be retained on a container neck when the container closure has been removed.

A known design of tamper evident ring includes a plurality of frangible connections initially joining the ring to the container closure, and a plurality of radial ramped projections to engage behind an annular tamper bead on the container neck. When the closure is removed for the first time, the projections engage the annular tamper bead to retain the ring on the neck, thus causing the frangible connections between the ring and the closure to become severed. The ramp shape of the projections is intended to allow the ring to be fitted easily on to the rim, but not easily removed.

However, a problem with this design is achieving reliability in use. Typically, this sort of ring might be about 80% reliable. If the projections are too small, the ring will be not retained securely on the neck, and it might remain intact with, or at least partly intact with, the closure when the closure is removed for the first time. Besides it being inconvenient for a user to have to separate the ring from the closure manually once the closure has been removed, this also means that the ring cannot give a guaranteed tamper-proof indication.

However if the projections are large to ensure that the ring will be retained reliably on the neck, it can then be difficult to fit the ring initially on the neck without risking damage to some of the severable connections.

Prior art (AU 701666) teaches us the use of a second means of engagement between the protrusions on the annular tamper band on the closure and protrusions on the neck of the container (i.e. neck protrusions other than the tamper bead on the neck of the container) such that this second means of engagement between the tamper ring and the container prevents unscrewing movement of the tamper ring greater than one half turn of rotation whereupon the said secondary engagement means becomes effective and further rotation to remove the closure causes the severing of the frangible attachments between the annular tamper band and the skirt of the cap.

With the majority of sealing methods the interaction between the closure means and the container neck occurs over a very small axial distance such that one half turn of the closure in the direction of removal, would remove the closure sealing means from juxtaposition with the container neck thereby allowing atmosphere and potential contaminants to enter into the container even though the tamper ring on the closure has not been broken.

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There is also the need for either designing the frangible connections with a cross section to impart sufficient strength to withstand the rigours of cap sorters and application onto the container but yet be sufficiently frangible to allow removal by persons of limited strength in hands and or wrists.

The present invention has been devised with the above problems in mind, and with the particular aim of providing an improved design of tamper evident ring.

In a first non limiting aspect the invention provides a tamper evident ring and a corresponding container neck for a container closure assembly consisting:

a container neck having threads to engage corresponding threads on a co-operating closure and with an annular tamper/retention bead having one or more interruptions, channels or gaps (channels) in it so that the tamper/retention bead is not continuous and the said channels may be constructed or shaped so as to present a surface to engage with a corresponding projection surface on the annular tamper ring on the closure and alternatively but not limiting the scope of the invention:-
a container neck with at least one channel in the tamper/retention bead shaped so as to minimise friction between the neck and the closure during application of the closure but shaped as to present an angled surface to engage with a corresponding surface or angled surface on the annular tamper ring on the closure:-

such that rotation motion to remove the closure causes engagement of the co-operating surfaces or angled surfaces on the neck of the container and the tamper ring on the closure such that further unscrewing movement creates lateral or axial stress or both lateral and axial stress on the frangible connections between the annular tamper ring and the skirt causing separation of the tamper band from the closure.

The orientation of the protrusions and or angled ramps may be such that the cooperating faces meet at angle that promotes a locking engagement.

The configuration of the interruptions, channels or gaps may be such that they may also be shaped in such a way or of such dimension as to facilitate engagement by some means with a device or feature on or of the closure tamper ring thereby facilitating a retention means to retain the tamper evident ring on the neck of the container.

The container tamper bead of the present invention will require less material and therefore enable the container to be produced for less cost than those revealed in prior art
And

A closure consisting of :

a top disc portion which may exhibit various sealing means on the inside thereby sealingly engaging one or more of the inside of the neck, the uppermost portion of the neck and the outside of the container neck and a depending skirt with internal thread or thread sections corresponding with the threaded container neck and an annular tamper evident ring frangibly depending from the skirt with one or more

protrusions ramped or shaped as to present less resistance upon application of the closure and shaped so that upon unscrewing movement engagement occurs with one or more of the interruptions, channels or gaps in the container annular tamper/retention bead thus preventing rotation of the tamper ring and therefore causing axial and lateral stress on the frangible bridges connecting the cap and the annular tamper evident ring such that the tamper evident ring is separated and evidences tampering before the sealing means on the closure is removed from sealing juxtaposition on the corresponding sealing surface on the container

protrusions ramped or shaped as to present less resistance upon application of the closure and shaped so that upon unscrewing movement and/or after separation from the closure body engagement occurs with the underside of the annular tamper/retention bead on the container neck thus preventing removal of the tamper ring and

a gap between the closure skirt and the depending tamper evidencing ring such gap leaving only the frangible bridges connecting the skirt and the tamper evidencing ring and such gap or line of severance shaped or directed so as to produce one or more features which create engagement between the closure skirt and the depending tamper evident ring and which engagement transfers the rotational force of application from the skirt to the tamper evident ring upon application thereby minimising stress on the frangible bridges during application of the closure to the container but such gap or line of severance also shaped or directed so as to create features which present little or no engagement upon removal rotation of the closure such that the breaking of the frangible bridges and separation of the tamper ring from the skirt is facilitated.

The present invention also extends to an alternate system whereby the concept of protrusions on the closure tamper ring engaging channels in the container tamper/retention bead may be replaced or combined with channels or recesses in the closure tamper ring co-operating with protrusions on the container neck. In such embodiment the tamper ring retention means having been replaced with one or more protrusions may be replaced with a very small channel in the container neck or a retention bead of much smaller dimension than heretofore used such that further savings by reduction of total cost of material used can be achieved.

The present invention also extends to any one or more of the foregoing aspects combined with or used in conjunction with

child resistant features one of which may be of the type whereby it is necessary to exert downward force either on the top of the closure or on the top of an over-cap which fits over the top of the closure, such that the downward force overcomes resistance thereby allowing engagement means between the over-cap and the closure to enable removal rotation of the closure to operate the tamper evident feature and remove the closure from the neck of the container and

push-pull valve type dispensing closures and

screw opening valve type dispensing closures

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